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Pudendal nerve block effect on post-operative urinary catheter-related bladder discomfort after robot-assisted radical prostatectomy

Pudendal nerve block for catheter-related bladder discomfort

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Abstract

Aim: In this study, we aimed to evaluate the effect of bilateral pudendal nerve block (PNB) on the prevention of catheter-related bladder discomfort (CRBD) in men undergoing robot-assisted radical prostatectomy (RARP).

Material and Methods: A total of 83 patients who had previously undergone RARP and were catheterized by a 20Fr urethral catheter were evaluated. Between December 2017 and January 2020, retrospective data of 75 eligible patients were examined in two groups: as receiving bilateral pudendal nerve block (PNB) or not receiving as the control group. Under fluoroscopic view and digital rectal guidance, mixture a of 8 ml of Bupivacaine 0.5% and 40 mg of methylprednisolone (total 10 ml) was injected by a spinal needle at each side for PNB. Pain assessment, CRBD severity, and degree of discomfort experienced were evaluated using the self-reported questionnaires and the Wong-Baker FACES (WB-FACES) scale immediately after the procedure and at postoperative 1, 2, 6, and 12th hours.

Results: No perioperative or postoperative complication related to the intervention was found in this retrospective data. Patients in the PNB group had statistically significantly lower CRBD values and lower WB-FACES scores compared to the control group ($p<0.05$) immediately after surgery and post-operatively. Furthermore, patients showed significant improvement, as assessed by the responses given to self-reported questionnaires, postoperatively.

Discussion: Bilateral PNB performed immediately after completion of RARP significantly decreased CRBD. This intervention may help improve patient comfort, decrease analgesic use, and reduce hospital stays after RARP.

Keywords

Catheter-Related Bladder Discomfort, Pudendal Nerve Block, Robot-Assisted Radical Prostatectomy

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Introduction

Since its introduction, robot-assisted radical prostatectomy (RARP) has been widely used in the surgical treatment of prostate cancer in men due to its long-term documented advantages. These include shorter duration of hospitalization, decreased postoperative pain, rapid recovery of continence, and earlier removal of the urethral catheter. However, catheter-related bladder discomfort (CRBD) is still a common and distressing symptom, especially during the postoperative period, even in patients undergoing RARP [1,2].

CRBD is defined as discomfort in the suprapubic area, a burning sensation or pain within the urethra or penis commonly associated with an urge to void and an increased frequency of urination [3,4]. It was postulated that CRBD may be due to irritation of the urothelium caused by the friction between the catheter and the epithelium [5]. This leads to involuntary bladder contractions through the activation of type three muscarinic receptors, thereby increasing acetylcholine release; it then causes involuntary detrusor contractions [5,6]. Previously, anticholinergics, analgesics, gabapentin, pregabalin, and several anesthetics, such as ketamine and dexmedetomidine, have been used in the management of CRBD [5,7-10]. However, it should be acknowledged that these drugs need to be repeatedly administered and they are not devoid of side effects, such as dry mouth, cognitive dysfunction in elderly patients, constipation, sedation, blurred vision, headache, insomnia, nausea, and vomiting [8-13].

Recently, pudendal nerve block (PNB) has been successfully used for analgesia after several surgical procedures, such as labor, vaginal interventions, sphincter injections, surgeries, and pudendal neuralgia [1]. It has been shown that the branches of the sacral somatic nerves form the afferent nerves of the urethra and bladder triangle; in males, they also provide sensation to the penis [14-15]. In an autopsy series, the terminal branch of the pudendal nerve was shown to be innervating the membranous urethra in more than half of the cases [16]. Considering the physiological role of pudendal innervation, we hypothesized that CRBD can be prevented by PNB. CRBD was prevented by PNB with ropivacaine in a trial of 94 male patients undergoing elective prostate surgery [1]. In another series of 175 patients undergoing transurethral resection of a prostate or bladder tumor, postoperative PNB decreased the incidence and severity of CRBD for the first 12 hours postoperatively [5]. The purpose of this study is to retrospectively evaluate the use of bilateral PNB to prevent CRBD and to determine its efficacy in men undergoing RARP.

Material and Methods

Study design and population

This study was conducted according to the principles of the Declaration of Helsinki, and written informed consent was obtained from all participants. The data were extracted from the hospital's electronic database after approval by the Research Ethics Committee (Approval number: E-70737436-050.01.04-2000324126). The trial is a single-center study that aimed to evaluate the efficacy of bilateral PNB in relieving CRBD and its role in patients' perception of pain and other catheter-related problems. The data of 83 patients undergoing RARP were collected. There was no randomization before data collection. We routinely performed RARP without bilateral PNB in our initial practice, and then we started to apply the block later on in other patients. All RARP procedures were performed by an experienced surgeon at a single robotic surgery center. All the patients received a 20-Fr Foley catheter with a balloon volume inflated to 15 mL. The patients were randomly divided into two groups: those receiving bilateral PNB (PNB group) and those not receiving bilateral PNB (control group). Patients with a history of bupivacaine allergy or a contraindication to steroid use were excluded from the study.

Bilateral PNB procedure

Using the fluoroscopic (with the cranially oblique angle) view of the pelvic region and after placing the index finger on the rectum, the ischial spine (IS) and sacrospinous ligament (SSL) were palpated. The IS was located using the index finger; then, under fluoroscopic guidance, a 10–12 cm length spinal needle was inserted percutaneously through the perineum until it reached the IS and the SSL. Next, a mixture of 8 ml of bupivacaine 0.5% and 40 mg of methylprednisolone (total of 10 ml) was injected into each side for PNB beneath the IS and SSL where the pudendal neurovascular bundle was localized.

Assessments

CRBD was assessed at 0 h (just after the patients were transferred to the PACU) and at 1, 2, 6, and 12 hours postoperatively. The discomfort was graded as described previously: no discomfort, "mild" when reported by patients only on questioning, "moderate" when reported by patients on their own without questioning and not accompanied by any movement or response, and "severe" when reported by patients on their own with accompanying behavioral responses, such as moving, a strong vocal response, or an attempt to remove the catheter [17]. We also used the Wong-Baker FACES (WB-FACES) pain rating scale, in which each of the six faces represents a person who has no pain (hurt), a little pain, a bit more pain, moderate pain, significant pain, and severe pain, respectively.

We further assessed CRBD by asking four additional questions: "Q1: Do you feel any pain in your penis?"; "Q2: Do you feel the catheter in your penis?" "Q3: Do you have an urgency to urinate?"; and "Q4: Do you have any urge to urinate, but are unable to do so?" The answers were classified into four categories as described previously (none, mild, moderate, or severe).

Statistical analysis

Statistical analysis was performed using SPSS version 21.0 (IBM Inc., Chicago, IL, USA). The independent samples t-test was used to compare demographic data. The data were expressed as mean + standard deviation (SD) or as a percentage (number). The ISUP grades as well as the answers to the four other questions related to catheter discomfort were compared using Chi-square and Mann-Whitney U tests. A p -value of less than 0.05 was considered statistically significant.

Ethical Approval

Ethics Committee approval for the study was obtained.

Results

Between December 2017 and January 2020, data from a total of 83 patients were examined. Three patients from the PNB group and five from the control group were excluded from the

study because they could not complete the questionnaires fully or clearly. Therefore, the postoperative data of 75 men were examined for the final analysis. There were no perioperative or early postoperative complications related to the intervention. Table 1 shows the demographic and clinical findings of the patients in both groups. No statistically significant difference was observed between the two groups concerning any of the parameters (P > 0.05). Similarly, no significant difference in ISUP degrees was found between the two groups in the final histopathological examination (P = .824).

Patients in the PNB group had no CRBD or mild CRBD at all the studied time intervals. Immediately after the procedure and postoperatively at 1 h, the patients in the control group had moderate to severe CRBD (Figure 1); the patients who received PNB had moderate CRBD to a lesser degree only immediately after RARP and at 1 h postoperatively. None of the patients in the PNB group had severe CRBD. The severity of CRBD between the two groups was only comparable at 6 h postoperatively (Figure 1).

Table 1. Demographic data of patients undergoing robot-assisted radical prostatectomy and bilateral pudendal nerve block.

Variables		PNB Group (n=51)	Control Group (n=24)	p
Age (Years)		62.73 (7.74)	61.25 (7.12)	0.432
Weight (Kg)		81.23 (10.05)	83.14 (11.82)	0.491
Pre-Op PSA (ng/dl)		12.33 (14.87)	7.85 (3.64)	0.047
Console Duration (Min)		102.75 (9.02)	104.88 (13.61)	0.49
Anesthesia Duration (Min)		152.35 (11.02)	150.29 (16.94)	0.529
ISUP Degree	ISUP 1	22 (43.1%)	8 (34.8%)	0.824
	ISUP 2	14 (27.5%)	8 (34.8%)	
	ISUP 3	9 (17.6%)	4 (17.4%)	
	ISUP 4	2 (3.9%)	2 (8.7%)	
	ISUP 5	4 (7.8%)	1 (4.3%)	

PNB: Pudendal nerve block; PSA =Prostate-specific antigen; ISUP = International Society of Urological Pathology

Table 2. Postoperative responses to catheter-related bladder discomfort questions after pudendal nerve block.

Questions & Answers		Immediately PO				PO 1h				PO 2h				PO 6h				PO 12h			
		PNB		Control		PNB		Control		PNB		Control		PNB		Control		PNB		Control	
		n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Q 1	None	17	33.3	0	0	33	64.7	0	0	48	94.1	0	0	49	96.1	10	41.7	51	100	21	87.5
	Mild	32	62.7	11	45.8	18	35.3	15	62.5	3	5.9	21	87.5	2	3.9	11	45.8	0	0	3	12.5
	Moderately	2	3.9	10	41.7	0	0	8	33.3	0	0	3	12.5	0	0	3	12.5	0	0	0	0
	Severe	0	0	3	12.5	0	0	1	4.2	0	0	0	0.	0	0	0	0	0	0	0	0
Q 2	None	11	21.6	0	0	9	17.6	0	0.0	5	9.8	0	0	22	43.1	0	0	39	76.5	1	4.2
	Mild	34	66.7	2	8.3	40	78.4	2	8.3	46	90.2	19	79.2	29	56.9	21	87.5	12	23.5	23	95.8
	Moderately	6	11.8	16	66.7	2	3.9	19	79.2	0	0	4	16.7	0	0	3	12.5	0	0	0	0
	Severe	0	0	6	25	0	0	3	12.5	0	0	1	4.2	0	0	0	0	0	0	0	0
Q 3	None	5	9.8	0	0.0%	13	25.5	0	0	36	70.6	9	37.5	44	86.3	15	62.5	51	100	20	83.3
	Mild	26	51	3	12.5	31	60.8	9	37.5	15	29.4	11	45.8	7	13.7	5	20.8	0	0	4	16.7
	Moderately	20	39.2	19	79.2	7	13.7	13	54.2	0	0	2	8.3	0	0	4	16.7	0	0	0	0
	Severe	0	0	2	8.3	0	0	2	8.3	0	0	2	8.3	51	0	0	0	0	0	0	0
Q 4	None	7	13.7	0	0	11	21.6	0	0	35	68.6	8	33.3	50	98.0	15	62.5	51	100	21	87.5
	Mild	36	70.6	5	20.8	40	78.4	13	54.2	16	31.4	5	20.8	1	2	7	29.2	0	0	3	12.5
	Moderately	8	15.7	12	50	0	0	7	29.2	0	0	11	45.8	0	0	2	8.3	0	0	0	0
	Severe	0	0	7	29.2	0	0	4	16.7	0	0	0	0	0	0	0	0	0	0	0	0

PO = Post-operative, H = Hour, PNB = Pudendal nerve block, Q1 = "Do you feel any pain on your penis?", Q2 = "Do you feel the catheter in your penis?", Q3 = "Do you have an urgency?", Q4 = "Do you feel any urge to urinate and but unable to urinate?".

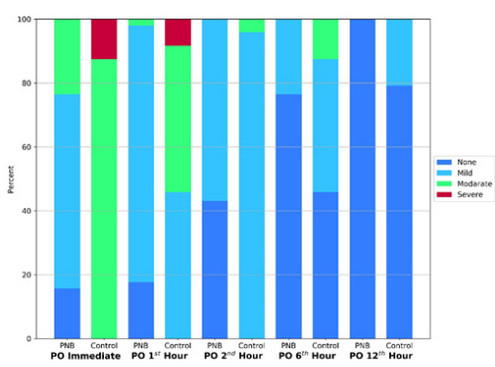

Figure 1. Incidence and severity of catheter-related bladder discomfort at all time intervals. (PO: Postoperative, PNB: Pudendal nerve block)

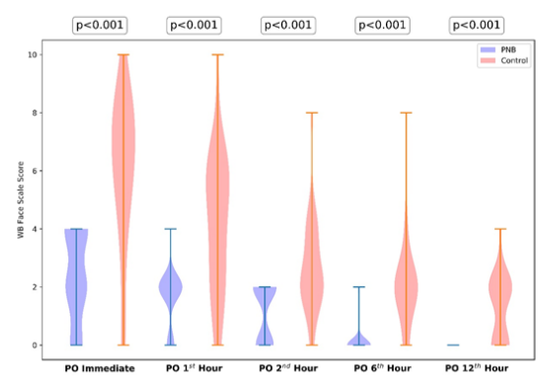

Figure 2. Wong-Baker Faces Pain Rating Scale during the postoperative 12 hours. (PO: Postoperative, PNB: Pudendal nerve block)

The WB-FACES pain rating scale scores showed a statistically significant difference between the PNB and control groups. All the patients showed decreased scores immediately after PNB and had low scores until 12 h postoperatively. The scores for the WB-FACES scale were significantly lower in the PNB group than in the control group at all time points (Figure 2).

Table 2 shows the details of the responses to other specific questions related to pain in the penis, feeling of incomplete emptiness, urgency, and the inability to urinate. A significantly higher proportion of patients in the PNB group experienced no or mild discomfort from the catheter immediately following the intervention as well as up to 12 hours later (P =0.002). The most bothersome complaints in the control group were pain in the penis and a sense of incomplete emptiness (Q4: Do you have any urge to urinate but are unable to do so?) The patients continued to have catheter-related discomfort 12 hours postoperatively (Table 2).

Discussion

RARP has been shown to have many advantages for both the surgeon and patients in the treatment of prostate cancer [2]. However, urinary catheterization is also essential with RARP, and CRBD remains a problem for patients, especially on the first postoperative day. It has been postulated that CRBD develops due to stimulation of the urethra by the catheter, stimulation of the trigone area by catheter balloon, afferent discharge and release of acetylcholine, detrusor muscle contraction, and release of inflammatory mediators, such as prostaglandins [18]. Considering these pathophysiological routes, several agents have been used to alleviate CRBD. These include antimuscarinics, gabapentin, pregabalin, anesthetics, such as ketamine and d-dexmedetomidine, tramadol, paracetamol, non-steroidal anti-inflammatory analgesics, and butylscopolamine [5,7,8,10,17].

Although it is known that patients often tolerate the aforementioned pharmacological agents, several side effects need to be considered. These include the anticholinergic side effects of antimuscarinics, a higher incidence of sedation by tramadol and ketamine, the use of increased doses of antiepileptics, such as pregabalin and gabapentin, and repeated administration of drugs [17]. To avoid these limitations, different interventions have been described in the literature. Weinberg described the use of a dorsal penile nerve block to prevent CRBD, but it failed to prevent or reduce the discomfort in that study's cohort [4]. Recently, bilateral nerve-stimulator-guided PNB has been applied to relieve CRBD in male patients undergoing lower urinary tract surgeries [5]. In the present study, we performed bilateral PNB using fluoroscopy in patients undergoing RARP, and we demonstrated that bilateral PNB significantly reduced or prevented postoperative CRBD.

It was previously reported that CRBD may be resistant to conventional analgesics since it has a different underlying mechanism [10]. As previously mentioned, considering the possible side effects of several pharmacological agents, PNB for analgesia due to CRBD can be a better alternative. PNB has been safely and effectively used for analgesia for labor during vaginal delivery, vaginal repair, sphincterotomy, and the treatment of pudendal neuralgia [19-21]. In 53% of the autopsy series, the terminal branch of the pudendal nerve was shown to innervate the membranous urethra; thus, it is not surprising that PNB has a strong analgesic effect when injected on either one or two sides [16]. In their randomized, parallel-controlled, double-blinded, single-center study, Xiaoqiang et al. evaluated the efficacy of bilateral PNB in 178 men undergoing lower urinary tract surgeries [5]. Bladder discomfort and postoperative pain were the primary outcomes, and they reported that the incidence of postoperative CRBD at 30 min, 2 h, and 8 h was significantly lower in the PNB group than in the control group [5]. In our study, the WB-FACES scale scores were significantly lower in the PNB group in comparison to the control group at all time points. This long-lasting effect may be related to the surgical technique. We performed RARP through abdominal laparoscopic ports, and Foley catheter insertion was the only urethral intervention. In contrast, Xiaoqiang et al. performed prostate or bladder tumor surgeries via the trans-urethral route [5].

In another attempt to prevent or alleviate CRBD after RARP, Weinberg et al. performed a dorsal penile block of bupivacaine in 56 men and used a placebo in 60 patients [4]. They found no difference between the groups concerning reported CRBD or bladder spasm-associated discomfort at any of the measured time points. Despite its prospective, randomized, double-blind design, that study was estimated to be underpowered to detect statistically significant differences, and the pain-rating scales were vulnerable to biases inherent in the questionnaires that were used [4]. Moreover, the hypothesis of pain reduction and CRBD by blockage of dorsal penile block may not be sufficient since innervation of the bladder and urethra is more complex. Considering that the branches of the sacral somatic nerves form the afferent nerves of the urethra and bladder triangle, which are derived from the second to fourth sacral roots, the pudendal nerve seems to have proximity and direct innervation to the male urethra and/or external sphincter [14,15]. Thus, bilateral PNB can be expected to be an effective anesthetic technique, especially for interventions of the lower urinary tract, including urinary catheterization.

In our series, we observed either no CRBD or mild CRBD in patients undergoing bilateral PNB at all time intervals, and none of the patients in the intervention group showed severe CRBD. This efficacy might be related to blockage of the inter-related innervation routes of the pudendal nerve as well as our strategy to combine bupivacaine and a low dose of methylprednisolone.

Discomfort at the injection site is the most common side effect of PNB. It may also be associated with local anesthetic side effects, allergic reactions, an extension of the anesthesia effect to the sciatic nerve region, sciatic fossa hematoma, and rarely, infection and abscess [5]. More serious side effects, such as pudendal nerve damage or structural injury of the organs in the proximity of the pudendal nerve, such as the bladder and rectum, occur rarely. One should also note the potential for pudendal artery puncture and subsequent intravascular injection of local anesthetics, which can cause systemic local anesthetic toxicity and potentially be fatal [22]. Our cohort observed no side effects, and we believe that fluoroscopic identification of several landmarks in patients with dorsal lithotomy positions provided better access and complication-free injection.

Our study has several limitations. First, we analyzed retrospectively collected data. Initial data belonged to the patients who had not received bilateral PNB. Thus, true randomization was not possible. Moreover, there was no initial blind randomization, all the analyses were performed at one robotic surgery center, and fixed doses of a combination of bupivacaine and methylprednisolone were used. Second, the role of bilateral PNB could have been compared to other types of urological procedures. Third, we did not assess the efficacy of bilateral PNB beyond 12 hours postoperatively. However, it was previously shown that the use of long-acting local anesthetics in PNB can last more than 10 hours [5]. Thus, we tested the analgesic effect of bilateral PNB in both the PNB intervention and control groups and found a head-to-head comparison for at least 12 hours.

Conclusion

Bilateral PNB with a combination of bupivacaine and methylprednisolone effectively reduces or prevents pain and CRBD) in men undergoing RARP compared to the control patients (no PNB injection.

Scientific Responsibility Statement

The authors declare that they are responsible for the article's scientific content including study design, data collection, analysis and interpretation, writing, some of the main line, or all of the preparation and scientific review of the contents and approval of the final version of the article.

Animal and human rights statement

All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. No animal or human studies were carried out by the authors for this article.

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Conflict of interest

None of the authors received any type of financial support that could be considered potential conflict of interest regarding the manuscript or its submission.

References

1. Li JY, Liao R. Prevention of catheter-related bladder discomfort - pudendal nerve block with ropivacaine versus intravenous tramadol: study protocol for a randomized controlled trial. Trials. 2016;17(1):448.

2. Ficarra V, Novara G, Artibani W, Cestari A, Galfano A, Graefen M, et al. Retropubic, laparoscopic, and robot-assisted radical prostatectomy: a systematic review and cumulative analysis of comparative studies. Eur Urol. 2009;55(5):1037-63.

3. Park JY, Hong JH, Yu J, Kim DH, Koh GH, Lee SA, et al. Effect of Ketorolac on the Prevention of Postoperative Catheter-Related Bladder Discomfort in Patients Undergoing Robot-Assisted Laparoscopic Radical Prostatectomy: A Randomized, Double-Blinded, Placebo-Controlled Study. J Clin Med. 2019;8(6):759.

4. Weinberg AC, Woldu SL, Bergman A, Roychoudhury A, Patel T, Berg W, et al. Dorsal penile nerve block for robot-assisted radical prostatectomy catheter related pain: a randomized, double-blind, placebo-controlled trial. Springerplus. 2014;3:181.

5. Xiaoqiang L, Xuerong Z, Juan L, Mathew BS, Xiaorong Y, Qin W, et al. Efficacy of pudendal nerve block for alleviation of catheter-related bladder discomfort in male patients undergoing lower urinary tract surgeries: A randomized, controlled, double-blind tria.. Medicine (Baltimore). 2017;96(49):e8932.

6. Andersson KE, Wein AJ. Pharmacology of the lower urinary tract: basis for current and future treatments of urinary incontinence. Pharmacol Rev. 2004;56(4):581-631.

7. Bala I, Bharti N, Chaubey VK, Mandal AK. Efficacy of gabapentin for prevention of postoperative catheter-related bladder discomfort in patients undergoing transurethral resection of bladder tumor. Urology. 2012;79(4):853-7.

8. Agarwal A, Gupta D, Kumar M, Dhiraaj S, Tandon M, Singh PK. Ketamine for treatment of catheter related bladder discomfort: a prospective, randomized, placebo-controlled and double blind study. Br J Anaesth. 2006;96(5):587-9.

9. Srivastava VK, Agrawal S, Kadiyala VN, Ahmed M, Sharma S, Kumar R. The efficacy of pregabalin for prevention of catheter-related bladder discomfort: a prospective, randomized, placebo-controlled double-blind study. J Anesth. 2015;29(2):212-16.

10. Kim HC, Lee YH, Jeon YT, Hwang JW, Lim YJ, Park JE, et al. The effect of intraoperative dexmedetomidine on postoperative catheter-related bladder discomfort in patients undergoing transurethral bladder tumour resection: A double-blind randomised study. Eur J Anaesthesiol. 2015;32(9):596-601.

11. Agarwal A, Raza M, Singhal V, Dhiraaj S, Kapoor R, Srivastava A, et al. The efficacy of tolterodine for prevention of catheter-related bladder discomfort: a prospective, randomized, placebo-controlled, double-blind study. Anesth Analg. 2005;101(4):1065-67.

12. Agarwal A, Dhiraaj S, Pawar S, Kapoor R, Gupta D, Singh PK. An evaluation of the efficacy of gabapentin for prevention of catheter-related bladder discomfort: a prospective, randomized, placebo-controlled, double-blind study. Anesth Analg. 2007;105(5):1454-7.

13. Agarwal A, Yadav G, Gupta D, Singh PK, Singh U. Evaluation of intra-operative tramadol for prevention of catheter-related bladder discomfort: a prospective, randomized, double-blind study. Br J Anaesth. 2008;101(4):506-10.

14. Robert R, Labat JJ, Riant T, Louppe JM, Hamel O. Le nerf pudendal: morphogenèse, anatomie, physiopathologie, clinique et thérapeutique [The pudendal nerve: clinical and therapeutic morphogenesis, anatomy, and physiopathology]. Neurochirurgie. 2009;55(4-5):463-9.

15. Song LJ, Lu HK, Wang JP, Xu YM. Cadaveric study of nerves supplying the membranous urethra. Neurourol Urodyn. 2010;29(4):592-5.

16. Qiu Y, Hu AM, Liu J, Du GZ. Dorsal penile nerve block for rigid cystoscopy in men: study protocol for a randomized controlled trial. Trials. 2016;17(1):147.

17. Bai Y, Wang X, Li X, Pu C, Yuan H, Tang Y, et al. Management of Catheter-Related Bladder Discomfort in Patients Who Underwent Elective Surgery. J Endourol. 2015;29(6):640-9.

18. Andersson KE. Detrusor myocyte activity and afferent signaling. Neurourol Urodyn. 2010;29(1):97-106.

19. Anderson D. Pudendal nerve block for vaginal birth. J Midwifery Womens Health. 2014;59(6):651-9.

20. Rouholamin S, Jabalameli M, Mostafa A. The effect of preemptive pudendal nerve block on pain after anterior and posterior vaginal repair. Adv Biomed Res. 2015;4:153.

21. Ricci P, Wash A. Pudendal nerve block by transgluteal way guided by computed tomography in a woman with refractory pudendal neuralgia expressed like chronic perineal and pelvic pain. Arch Esp Urol. 2014;67(6):565-71.

22. Kalava A, Pribish AM, Wiegand LR. Pudendal nerve blocks in men undergoing urethroplasty: a case series. Rom J Anaesth Intensive Care. 2017;24(2):159-62.

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